METHOD AND COMPOSITION FOR COATING MAT AND ARTICLES PRODUCED THEREWITH

This application is a continuation of U.S. patent application Ser. No. 10/324,109 filed Dec. 20, 2002, entitled "METHOD AND COMPOSITION FOR COATING MAT AND ARTICLES PRODUCED THEREWITH", which issued as U.S. Pat. No. 7,138,346, which claims the priority and benefit of U.S. Provisional Application Ser. No. 60/341,277, filed Dec. 20, 2001, entitled "METHOD AND COMPOSITION FOR COATING MAT AND ARTICLES PRODUCED THEREWITH", each of which are incorporated herein by reference.

BACKGROUND

1. Field of the Invention

The field of the invention pertains to mats, webs, or facers for the building construction industry, such as gypsum board fiberglass facers and thermosetting polyiso foam insulation board facers, as well as processes for making/applying such facers and products utilizing such facers.

2. Related Art and Other Considerations

Many forms of weather resistant webbed sheets have been developed for the building construction industry for installation as an "underlayment" under shingles or under siding. Examples of such webbed sheets, also called "construction paper", range from the old original "tar paper", up to the spun-bonded polyolefin house wraps of the present day.

Various types of webbed sheets have also been used as a "facer" material for foamed insulation board laminates, with the laminates ultimately being utilized as side-wall or roofing insulation. For example, two facers for a laminate board typically sandwich a core material therebetween, e.g., a laminated foam core, for example. A popular material ("facer") in this category is the web of U.S. Pat. No. 5,112,678 to Gay et al (referred to herein as the '678 patent). The relatively fire-resistant web of the '678 patent has also served well as an underlayment in a U.L. Incorporated fire-resistant rated roofing system over wooden decks, etc. For many years this material has served the building construction industry, e.g., as the facer for the laminated foam board product taught in U.S. Pat. No. 5,001,005. The foam board of U.S. Pat. No. 5,001,005 remains an important and integral part of both roofing and side-wall insulation.

FIG. **1** shows a prior art coating method suitable for applying coatings such as those of U.S. Pat. No. 5,112,678. A raw glass mat **10** (e.g., the "substrate") enters a coating station at a level lower than a top of an applicator roll **12**. The direction of travel of the glass mat **10** is parallel to a "machine direction" (M.D.) of a facer produced by the machine, while a dimension perpendicular to the machine direction and perpendicular to the plane of FIG. **1** is understood to be parallel to a "cross machine direction" (C.M.D.) of a resultant facer similarly oriented. The applicator roll is driven to rotate about its axis (either clockwise or counterclockwise, as depicted by arrow **13**). A coating pan **14** is filled with a coating mix **16** up to a level that is sufficient for the applicator roll **12** to pull an adequate amount of coating to the top of the applicator roll **12**. The speed of rotation of applicator roll **12** is used to get adequate amounts of coating mix **16** up into the glass mat **10** as the glass mat **10** is conveyed. In its path of conveyance, the glass mat **10** extends around applicator roll **12** in a wrap-arc **18**. A scraper blade **20** is placed so that the excess coating scraped off returns into the coating pan **14**. After the excess is scraped off, the coated mat proceeds into a dryer section (not shown) where the coated glass mat facer **22** is dried and wrapped into rolls.

The prior art process of FIG. **1** is characterized by a wrap arc **18** at the applicator roll **12** and a wrap angle **28** at the scraper blade **20**. Conventionally, the wrap arc **18** on the applicator roll **12** is less than 30 degrees, and typically less than 20 degrees. The wrap angle **28** around the scraper bar **20** is conventionally slightly less than 180-degrees; e.g., 175-degrees.

In the construction industry, building materials are often analyzed to determine their performance vulnerabilities or weak points. A vulnerability for a laminated board made with a coated glass mat facer can be the structural integrity of the glass mat which comprises the facer. In other words, how well the glass mat of the facer holds together under stress, e.g., the cohesive strength (or lack of strength) of the glass mat, is an important indicia of material quality. Experience has generally shown that the cohesive strength of any glass mat is typically too low to resist the pulling-away force of high wind shear vacuums, whether the glass mat be incorporated either in a stucco wall or under a fully adhered single-ply membrane roofing system.

One factor influencing structural integrity of a building material which incorporates a coated glass mat is the degree to which glass fibers comprising the mat are uncovered. Uncovered glass fibers are exposed and thus more subject to deleterious forces.

The complications of using coated glass mats as ingredients in building materials such as a board are compounded when the glass mats interface with certain other materials which comprise the board core. One example of such a complicating material is Gypsum. Most gypsum board applications are more difficult, and much stronger coated glass mats are required. While the problems presented by gypsum could perhaps be solved by using heavier raw glass mat substrates, such an option is quite expensive. A challenge, therefore, is strengthening the coated glass mat (e.g., strengthening the facer) without substantially increasing costs.

The history of gypsum board development has passed many milestones, many of these milestones being related to the surfaces, or facers, covering the broad surface of a gypsum board. In almost all cases, the subject of facer stability was an issue. Also the facers have had to resist weathering as well as retaining constant dimensions. Mildew and mold have been a problem with the original multi-ply paper facers used on gypsum board. Unfortunately, the paper facers also might not allow water vapor to escape. Yet the escape of water vapor is essential in curing the gypsum. While these paper facers have been modified with chemicals to improve their properties, most of the gypsum board progress and success has come by changing from paper facers to fiberglass mat facers.

The entire scope of manufacturing different facer materials for building products is extensive, encompassing both fields of gypsum board fiberglass facers and thermosetting polyiso foam insulation board facers. In recent years, many facer-related methods and products thereof have been taught in United States patents such as the following (all of which are incorporated herein in their entirety by reference):

3,284,980	3,993,822	4,504,533	4,637,951
4,647,496	4,784,897	4,810,569	4,879,173
5,112,678	5,148,645	5,171,366	5,220,762
5,319,900	5,342,566	5,342,680	5,371,989
5,395,685	5,397,631	5,401,588	5,552,187